

IN THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 2. This sheet, which includes Fig. 2, replaces the replacement sheet including Fig. 2, filed on February 1, 2007.

Attachment: Replacement Sheet

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 2-6, 9-21 are presently active in this case. Claims 7 and 8 cancelled, Claims 9, 11, 12, 14, and 17-19 amended by way of the present amendment. Claims 20 and 21 are added, and the specification and drawings are also amended by way of the present amendment.

In the outstanding office action, the drawings were objected to; Claims 14-16, 18 and 19 were rejected under 35 U.S.C. 112, first paragraph as not complying with the enablement requirement; Claims 13-15 and 19 were rejected under 35 U.S.C. 112, second paragraph as being indefinite; Claims 2-9 and 16-18 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,073,576 to Moslehi; and Claims 10-15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moslehi in view of U.S. Application No. 2002/0029745 A1 to Nagaiwa.

First, Applicants wish to thank Examiner Zervignon for the September 20, 2007 personal interview at which time the outstanding issues in this case were discussed. During the interview, Applicants presented amendments and arguments substantially as indicated in this response. No agreement was reached.

With regard to the objection to the drawings, Applicant has now amended Fig. 2 to show the claimed features of the heat conducting element. Further, Applicants have amended the claims such that all claimed features are recited in terms consistent with the specification's description of these features in the drawings. Therefore, the objection to the drawings is believed to be overcome.

With respect to the rejection under 112, first paragraph, Applicants have amended the specification (including the drawings) to describe the detailed structure of the heat conducting

element. As discussed in the September 20<sup>th</sup> interview, these detailed features are fully supported by Fig. 2 of the specification as originally filed. Therefore the amendment to the specification does not raise an issue of new matter, and the rejection under 112, first paragraph is overcome.

With regard to the rejection under 112, second paragraph, Applicants have amended the claims to address each of the informalities note in the Office Action. Therefore, as discussed in the September 20<sup>th</sup> interview, the rejection under 112, second paragraph is overcome.

Turning now to the merits, in order to expedite issuance of a patent in this case, Applicants have amended the pending independent claims to clarify the patentable features of the present invention over the cited references. Specifically, independent Claim 9, as amended, recites a temperature-controlled shield ring for shielding a substrate holder in a semiconductor processing system. The temperature-controlled shield ring includes a cap having a coolant passage therein, and a plenum adaptor coupled to the cap and configured to connect to a coolant system for circulating coolant to the coolant passage. The plenum adaptor has a plenum adapter ring configured to be supported by a substrate holder when the shield ring is supported by the substrate holder. Also recited is that the plenum adaptor does not include any fastening mechanism for maintaining a position of the shield ring on the temperature controlled substrate holder. Claim 17 similarly recites that the temperature controlled shield ring rests on the second surface of the temperature controlled substrate holder without any fastening mechanism maintaining a position of the shield ring on the temperature controlled substrate holder.

Thus, Applicants Claims 9 and 17 have been amended to clarify that the temperature controlled shield ring rests on the second surface of the temperature controlled substrate

holder without any fastening mechanism maintaining a position of the shield ring on the temperature controlled substrate holder. This negative limitation is clearly supported by Applicants' specification at paragraphs 14 and 29.<sup>1</sup> This feature provides an advantage in that the temperature controlled shield ring can be provided on existing substrate holders without reworking the existing substrate holder to include mounting hardware.<sup>2</sup>

In contrast, the cited reference to Moslehi et al. discloses a substrate clamping device for mechanically holding a substrate during processing. As seen in Fig. 10 of Moslehi et al., a peripheral edge of the substrate 352 is contacted by the mechanical clamp 386 to form a "first seal" 388 that holds the substrate in place. A support ring 398 is provided radially outward of the first seal in order to support the mechanical clamp in its holding position. A pair of O-rings 392 create a "second seal" between the support ring 398 and the mechanical clamp 386. Further, the support ring 398 includes a coolant passage therein, which cools the O-rings to prevent failure by overheating. However, the support ring 398 is not a shield ring. As discussed in the September 20<sup>th</sup> interview, the mechanical clamp 386 is provided above the supporting ring 398, and thus there is no shielding function provided by the supporting ring. Indeed, Moslehi et al. does not disclose a shield ring as this term is used in Applicants' specification and understood by one of skill in the art. Applicants submit that for this reason alone, Claims 9 and 17 patentably define over the cited reference to Moslehi et al.

Further, even assuming that the support ring 398 can be considered the claimed shield ring, the ring 398 is described in Moslehi et al. as an "extension of the chuck body."<sup>3</sup> Thus, the support ring 398 is not a shield ring that rests on the temperature controlled substrate holder without any fastening mechanism maintaining a position of the shield ring on the

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<sup>1</sup> US 2004/0244949 (Applicants' published application) at paragraphs 14 and 29.

<sup>2</sup> Applicants' published specification at paragraph 14.

<sup>3</sup> 6,073,576 (Moslehi et al.) at col. 14, lines 54-65.

temperature controlled substrate holder as now also required by independent Claims 9 and 17. The secondary reference to Nagaiwa et al. does not correct this deficiency. As seen in Fig. 8 of Nagaiwa et al. a focus ring 52 having backside cooling is positioned adjacent to the substrate W. Not only does the focus ring have different functionality than the claimed shield ring (i.e. it is not a shield ring at all), but the focus ring is clearly fastened to the substrate holder by fastener 56A.

The Office Action takes the position that the lack of fasteners is an “intended use” of the shield ring. However, Applicants have amended Claims 9 to recite this negative limitation as a structural feature of the claimed temperature controlled shield ring. Further, while the lack of fasteners was previously only claimed as part of the shield ring, this feature is now recited in Claim 17 in the context of the substrate assembly. Finally, as noted above, the absence of fasteners provides a substantial benefit in that the temperature controlled shield ring can be provided on existing substrate holders without expensive and complex retrofitting to include fastening devices for the substrate holder. The prior art devices cannot provide this advantage.

Therefore, Claims 9 and 17 patentably define over the cited references. As the remaining pending claims in this case depend from Claim 9 or 17, these remaining dependent claims also patentably define over the cited references. Nevertheless, Applicants submit that pending dependent claims provide further bases for patentability over the cited references. Specifically, Claim 15 recites that the second segment of the heat conducting element includes a protrusion extending substantially perpendicular from the second segment so as to provide a discrete surface for contacting the substrate holder surface. As discussed in the September 20th interview, this feature is supported by Fig. 2, and provides improved thermal conduction between the substrate, substrate holder and cap of the shield ring. The prior art

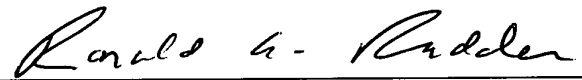
does not disclose this protrusion, and the Office action does not address this deficiency (perhaps due to the now overcome rejection under 112, first paragraph). Thus, Claim 15 provides a further basis for patentability over the cited references.

Further, Applicants have added Claims 20 and 21, which recite that a top surface of the shield ring is substantially coplanar with said first surface of the substrate holder when the shield ring is supported by the substrate holder. An example of this configuration is shown in Applicants' Fig. 2 as originally filed. As seen in this figure, the shield ring 62 rests on the substrate holder 30 by contact of the plenum support ring 252 with a shoulder of the substrate holder 30 such that a top surface of the shield ring (facing the process space above the substrate 35) is substantially coplanar with a support surface of the substrate holder 30 that supports the substrate 35. Even assuming that the support ring of Moslehi et al. can be considered a shield ring, a top surface of the support ring is not coplanar with a top surface of the substrate or substrate holder as now required by Claims 20 and 21. Moreover, as pointed out by Examiner Zervington during the personal interview, it would not be obvious to provide the coplanar relationship between the substrate support surface and the top surface of the ring 398 of Moslehi et al. because doing so would expose the O-rings to the processing environment. This would render the support ring 398 and O-rings unfit for their intended purpose. As noted above, the secondary reference to Nagaiwa et al. does not disclose a shield ring at all, and therefore also does not disclose the substantially coplanar feature. Thus, Claims 20 and 21 also provide further basis for patentability over the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application. The present application is believed in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION: Steven T. FINK

SERIAL NO.: 10/809,436

GAU: 1763

FILED: March 26, 2004

EXAMINER: Rudy ZERVIGON

FOR: TEMPERATURE CONTROLLED SHIELD RING

**LETTER SUBMITTING REPLACEMENT DRAWING SHEET(S)**

COMMISSIONER FOR PATENTS  
Alexandria, VA 22313

SIR:

Responsive to the below indicated communication, the following drawing sheets are submitted herewith:

☒ 1 Replacement Drawing Sheets

☐ \_\_\_\_\_ New Drawing Sheets

☒ Official Action dated April 27, 2007.

☐ Notice of Allowance/Issue Fee dated \_\_\_\_\_

☐ Other dated \_\_\_\_\_

The changes and/or modifications made include the following:

Fig. 2 now shows the claimed features of the heat conducting element.

Respectfully Submitted,

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